Functional Ecology

EDITORS
P. CALOW & J. GRACE

Volume 7

1993

Volume Contents

Blackwell Scientific Publications
OXFORD · LONDON · EDINBURGH
BOSTON · MELBOURNE · PARIS · BERLIN · VIENNA

© 1993 British Ecological Society.

Authorization to photocopy for internal or personal use, or the internal or personal use of specific clients, is granted by the British Ecological Society for libraries and other users registered with the Copyright Clearance Centre (CCC) Transactional Reporting Service, provided that the base fee of $10.00 per copy is paid directly to CCC, 27 Congress Street, Salem, MA 01970, USA. This consent does not extend to other kinds of copying, such as copying for general distribution for advertising or promotional purposes, for creating new collective works or for resale. Special requests should be addressed to the Editor. 0269-8463/93 $10.00.

Published by Blackwell Scientific Publications Ltd
Osney Mead, Oxford OX2 0EL, UK
25 John Street, London WC1N 2BL, UK
23 Ainslie Place, Edinburgh EH3 6AJ, UK
238 Main St, Boston, MA 02142, USA
54 University Street, Carlton, Victoria 3053, Australia
1 rue de Liue, 75006 Paris, France
Düsseldorfer Strasse 38, D-10707 Berlin, Germany
Feldgasse 13, A-1238 Vienna, Austria

ISSN 0269-8463

Typeset by R. D. Composition Ltd, Glasgow
Printed by The Devonshire Press, Torquay

CONTENTS

Volume 7 Number 1 1993

1 Editorial Report

Essay Review

5 The ecological impact of animal nests and burrows
M. H. HANSELL

13 The interaction of harvester ants and vesicular–arbuscular mycorrhizal fungi in a patchy semi-arid environment: the effects of mound structure on fungal dispersion and establishment
C. F. FRIESE & M. F. ALLEN

21 Herbivory modifies the production of different leaf types in the yellow water-lily, *Nuphar lutea* (Nymphaeaceae)
J. KOUKI

27 Host discrimination in parasitic wasps: when is it advantageous?
W. W. WEISSER & A. I. HOUSTON

40 Food availability and resource allocation in senescent *Placopecten magellanicus*: evidence from field populations
B. A. MACDONALD & B. L. BAYNE

47 Competition, herbivory and plant size variability: *Hypochaeris radicata* grazed by snails (*Helix aspersa*)
J. WEINER

54 Nutrient costs of vertebrate- and ant-dispersed fruits
L. HUGHES, M. WESTOBY & A. D. JOHNSON

63 Evidence for optimal partitioning of biomass and nitrogen at a range of nitrogen availabilities for a fast- and slow-growing species
A. VAN DER WERF, A. J. VISSER, F. SCHIEVING & H. LAMBERS

75 Covariances between traits deriving from successive allocations of a resource
G. de JONG

84 Local adaptation of the tremadote *Diplostomum phoxini* to the European minnow *Phoxinus phoxinus*, its second intermediate host
P. BALLABENI & P. I. WARD

91 Facultative physiological adaptation and compensation to winter stresses in the predatory leech *Nephelopsis obscura*
E. DRATNAL, D. C. REDDY, B. BIERNACKA & R. W. DAVIES

97 Gas exchange of oil palm in relation to light, vapour pressure deficit, temperature and leaf age
E. DUFRENE & B. SAUGIER

105 The role of flooding resistance in the establishment of *Rumex* seedlings in river flood plains
L. A. C. J. VOESENEK, F. J. M. M. VAN OORSCHOT, A. J. M. SMITS & C. W. P. M. BLOM

115 Foliage orientation and carbon gain in two tussock grasses as assessed with a new whole-plant gas-exchange model
R. J. RYEL, W. BEYSCHLAG & M. M. CALDWELL

Technical Report

125 A controlled environment chamber for growing plants across a subambient CO_2 gradient
H. S. MAYEUX, H. B. JOHNSON, H. W. POLLEY, M. J. DUMESNIL & G. A. SPANEL

Forum

134 Evolution of body size; predictions from energetics
J. R. SPEAKMAN

135 The fasting endurance model: a testable hypothesis
G. J. HICKLING & J. S. MILLAR

136 Instructions to Contributors

Volume 7 Number 2 1993

Essay Review

139 Seasonal acclimatization and latitudinal compensation in metabolism: do they exist?
A. CLARKE

Essay Review

150 Does defoliation affect reproductive output in herbaceous perennials and woody plants in different ways?
J. R. OBESO

156 Competition at community boundaries: mechanisms of vegetation structure in a dune–slack complex
K. STUDER-EHRENSBERGER, C. STUDER & R. M. M. CRAWFORD

169 Resource dynamics and vegetation processes: a deterministic model using two-dimensional cellular automata
R. L. COLASANTI & J. P. GRIME

177 The clonal ecology of *Heterocypris incongruens* (Ostracoda): life-history traits and photoperiod
V. ROSSI & P. MENOZZI

183 The advantage of a big head:swallowing performance in adders, *Vipera berus*
A. FORSMAN & L. E. LINDELL

190 A new aspect of warfarin resistance in wild rats: benefits in the absence of poison
P. SMITH, M. BERDOY, R. H. SMITH & D. W. MACDONALD

195 Locomotor performance of bipedal and quadrupedal heteromyid rodents
M. DJAWDAN

203 Multiple mating, lifetime fecundity and female mortality of the bruchid beetle, *Callosobruchus maculatus* (Coleoptera: Bruchidae)
C. W. FOX

209 Male investment in the European corn borer, *Ostrinia nubilalis* (Lepidoptera: Pyralidae): impact on female longevity and reproductive performance
L. ROYER & J. N. McNEIL

216 The interaction of food availability and endogenous physiological cycles on the grazing ecology of red deer hinds (*Cervus elaphus*)
M. J. HEYDON, A. M. SIBBALD, J. A. MILNE, B. R. BRINKLOW & A. S. I. LOUDON

223 A comparative study of the growth and morphology of eight grass species from habitats with different nutrient availabilities
W. TH. ELBERSE & F. BERENDSE

230 Canopy structure of a tropical rain forest and the nature of an unstratified upper layer
F. KOIKE & SYAHBUDDIN

236 Seed size and shape predict persistence in soil
K. THOMPSON, S. R. BAND & J. G. HODGSON

242 Rates of phosphorus transfer within and between ryegrass (*Lolium perenne*) plants
E. I. NEWMAN & W. R. EASON

Volume 7 Number 3 1993

Essay Review

249 A critique of the use of distribution-based extrapolation models in ecotoxicology
T. L. FORBES & V. E. FORBES

255 Effects of diet quality on the nestling growth of a wild insectivorous passerine, the house martin *Delichon urbica*
R. D. JOHNSTON

267 Reproductive effort and maternal age in iteroparous insects using aphids as a model group
A. F. G. DIXON, R. KUNDU & P. KINDLMANN

273 The effects of consumption rate and temperature on apparent digestibility coefficient, urate production, metabolizable energy coefficient and passage time in canyon lizards (*Sceloporus merriami*) from two populations
S. J. BEAUPRE, A. E. DUNHAM & K. L. OVERALL

281 Trade-offs between sprinting and clinging ability in Kenyan chameleons
J. B. LOSOS, B. M. WALTON & A. F. BENNETT

287 Nitrogen acquisition and use in three perennials in the early stage of primary succession
N. CHIBA & T. HIROSE

293 Plants as mosaics: leaf-, ramet-, and gender-level variation in the physiology of the dwarf willow, *Salix arctica*
T. E. DAWSON & L. C. BLISS

305 Reduced mixing in a marine macrophyte canopy
J. D. ACKERMAN & A. OKUBO

310 Leaf area index and above-ground biomass of *terra firme* rain forest and adjacent clearings in Amazonia
A.-L. C. McWILLIAM, J. M. ROBERTS, O. M. R. CABRAL, M. V. B. R. LEITAO, A. C. L. de COSTA, G. T. MAITELLI & C. A. G. P. ZAMPARONI

318 Desiccation resistance in six sub-Antarctic weevils (Coleoptera: Curculionidae): humidity as an abiotic factor influencing assemblage structure
S. L. CHOWN

326 Nutrient acquisition by clipped plants as a measure of competitive success: the effects of compensation
L. L. WALLACE & S. A. MACKO

332 Effect of the castrating trematode parasite *Rhipidocotyle fennica* on energy allocation of fresh-water clam *Anodonta piscinalis*
J. JOKELA, L. UOTILA & J. TASKINEN

339 The relationship of closing force to body size for the major claw of *Uca pugnax* (Decapoda: Ocypodidae)
J. S. LEVINTON & M. L. JUDGE

346 Changes in the microbial biomass and metabolic quotient during leaf litter succession in some New Zealand forest and scrubland ecosystems
D. A. WARDLE

356 A root–shoot partitioning model based on carbon–nitrogen–water interactions and Münch phloem flow
R. C. DEWAR

369 A system for measuring *in situ* CO_2 and CH_4 flux in unmanaged ecosystems: an arctic example
G. L. VOURLITIS, W. C. OECHEL, S. J. HASTINGS & M. A. JENKINS

Forum

380 A comment on Silvertown, Franco & McConway (1992)
J. P. GRIME

380 The eternal triangle—an attempt at reconciliation
J. SILVERTOWN, M. FRANCO & K. McCONWAY

381 An olive branch and further clarification
J. P. GRIME

383 Erratum

384 Announcement

Volume 7 Number 4 1993

385 Plasticity of leaf anatomy of two rain forest shrubs in relation to photosynthetic light acclimation
R. L. CHAZDON & S. KAUFMANN

395 Effect of maternal light environment on seed germination in *Piper auritum*
A. OROZCO-SEGOVIA, M.E. SANCHEZ-CORONADO & C. VAZQUEZ-YANES

403 Does the land snail *Arianta arbustorum* prefer sequentially mixed over pure diets?
B. SPEISER & M. ROWELL-RAHIER

411 Reproductive trade-offs in caridean shrimps
A. CLARKE

420 Blood parasites and reproductive success of Tengmalm's owls: detrimental effects on females but not on males?
E. KORPIMÄKI, H. HAKKARAINEN & G. F. BENNETT

427 The role of coprophagy in digestion in voles (*Microtus agrestis* and *Clethrionomys glareolus*)
W. B. LEE & D. C. HOUSTON

433 Influence of shoot structure on the photosynthesis of Sitka spruce (*Picea sitchensis*)
Y. P. WANG & P. G. JARVIS

452 Nectarless honey mesquites
J. LÓPEZ-PORTILLO, L. E. EGUIARTE & C. MONTAÑA

462 Morphological response to competition in red alder: the role of water
P. A. GIORDANO & D.E. HIBBS

469 Interactions between density-dependent and age-specific selection in *Drosophila melanogaster*
L. D. MUELLER, J. L. GRAVES & M. R. ROSE

480 Growth and photosynthesis of two deciduous forest species at elevated carbon dioxide
A. EL KOHEN, L. VENET & M. MOUSSEAU

487 Prediction of forced ventilation in animal fur under ideal pressure distribution
W. E. STEWART, S. BUDARAJU, W. P. PORTER & J. JAEGER

Technical Reports

493 A method to isolate environmental effects on nestling growth, illustrated with examples from the great tit (*Parus major*)
L. F. KELLER & A. J. VAN NOORDWIJK

503 A portable device for the simulation of air frosts at remote field locations
P. C. THORPE, C. W. MACGILLIVRAY & G. H. PRIESTMAN

Forum

506 On future discounts and economic analogy in life-history studies
N. PERRIN

507 Formal equivalence among resource allocation models: what is the appropriate currency?
M. LERDAU

509 Testing *vs* research in ecotoxicology: a response to Baird and Calow
V. E. FORBES & M. H. DEPLEDGE

510 Can toxicity testing contribute to ecotoxicology?
D. J. BAIRD

511 Ecotoxicology and the power of clones
V. E. FORBES & T. L. FORBES

Volume 7 Number 5 1993

513 Optimal adult growth of *Daphnia* in a seasonal environment
B. E. TAYLOR & W. GABRIEL

522 Diet choice by a grass-feeding grasshopper based on the need for a limiting nutrient
S. T. BEHMER & A. JOERN

535 Differential atresia of ovarian follicles and its effect on the clutch size of two populations of the viviparous lizard *Sceloporus mucronatus*
F. R. MÉNDEZ-DE LA CRUZ, L. J. GUILLETTE, JR & M. VILLAGRAN-SANTA CRUZ

541 Why do ladybirds lay eggs in clusters?
B. K. AGARWALA & A. F. G. DIXON

549 Rates of pollen deposition and removal in *Myosotis colensoi*
A. W. ROBERTSON & D. G. LLOYD

560 Sperm competition in mammals: a comparative study of male roles and relative investment in sperm production
P. STOCKLEY & A. PURVIS

571 Interspecific differences in desiccation tolerance of juvenile land snails
T. ASAMI

578 Freezing tolerance in some Antarctic nematodes
D. A. WHARTON & W. BLOCK

585 Light environment and phytochrome-controlled germination in *Piper auritum*
A. OROZCO-SEGOVIA, M. E. SANCHEZ-CORONADO & C. VAZQUEZ-YANES

591 Physiological basis and ecological significance of the seed size and relative growth rate relationship in Mediterranean annuals
T. MARAÑÓN & P. J. GRUBB

600 Root orientation *vs* water uptake simulated for monocotyledonous and dicotyledonous desert succulents by a root-segment model
P. S. NOBEL & D. M. ALM

610 Acclimatization to flooding of the herbaceous vine, *Mikania scandens*
M. MOON, M. R. RATTRAY, F. E. PUTZ & G. BOWES

616 Vesicular–arbuscular mycorrhizal fungi: a determinant of plant community structure in early succession
A. C. GANGE, V. K. BROWN & G. S. SINCLAIR

623 Phenotypic variation in contrasting temperature environments: growth and photosynthesis in *Pennisetum setaceum* from different altitudes on Hawaii
D. G. WILLIAMS & R. A. BLACK

634 Reserve carbon and photosynthesis: their role in regrowth of *Themeda triandra*, a widely distributed subtropical graminaecous species
J. E. DANCKWERTS

Volume 7 Number 6 1993

643 Relationship between foraging effort and energy requirement throughout the breeding season in the wandering albatross
M. SALAMOLARD & H. WEIMERSKIRCH

653 Effects of the microclimate in natural nests on development of embryonic painted turtles, *Chrysemys picta*
K. D. CAGLE, G. C. PACKARD, K. MILLER & M. J. PACKARD

661 Further responses to CO_2 enrichment in British herbaceous species
R. HUNT, D. W. HAND, M. A. HANNAH & A. M. NEAL

669 The effect of leaf flutter on the flux of CO_2 in poplar leaves
J. S. RODEN & R. W. PEARCY

676 Effects of sand accretion on photosynthesis, leaf-water potential and morphology of two dune grasses
TAO YUAN, M. A. MAUN & W. G. HOPKINS

683 Sunfleck frequency and duration affects growth rate of the understorey plant, *Alocasia macrorrhiza*
D. A. SIMS & R. W. PEARCY

690 Nutritional effects and costs of a tannin in a grazing and a browsing macropodid marsupial herbivore
C. McARTHUR & G. D. SANSON

697 Nutritional effects and costs of a tannin in two marsupial arboreal folivores
C. McARTHUR & G. D. SANSON

704 Water economy of granivorous birds: Australian parrots
R. E. MacMILLEN & R. V. BAUDINETTE

713 Ecotypic variation of xylem embolism, phenological traits, growth parameters and allozyme characteristics in *Fagus sylvatica*
M. BORGHETTI, S. LEONARDI, A. RASCHI, D. SNYDERMAN & R. TOGNETTI

721 Reconciling apparent discrepancies among studies relating life span, structure and function of leaves in contrasting plant life forms and climates: 'the blind men and the elephant retold'
P. B. REICH

726 Female body condition and breeding of the Ural owl *Strix uralensis*
H. PIETIÄINEN & H. KOLUNEN

736 Potential for persistence of genes escaped from canola: germination cues in crop, wild, and crop-wild hybrid *Brassica rapa*
L. S. ADLER, K. WIKLER, F. S. WYNDHAM, C. R. LINDER & J. SCHMITT

Forum

746 How should we calculate CO_2 production in doubly labelled water studies of animals?
J. R. SPEAKMAN

751 Classes of insect cold hardiness
J. S. BALE

754 In praise of plants as biomonitors—send in the clones
L. LOVETT DOUST, J. LOVETT DOUST & M. SCHMIDT

759 Author Index

763 Subject Index